IN THE CLAIMS:

1. (Currently Amended) A method of manufacturing an optical waveguide having a core layer and a cladding layer ~~for~~ covering the core layer, comprising:

forming~~wherein a~~ silicon nitride ~~film serving~~ as the core layer ~~is formed~~ by plasmanizing a gas mixture containing a methylsilane and at least ~~any~~ one of nitrogen ($N_2$) and~~or~~ ammonia ($NH_3$) for reaction~~to react~~.

2. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 1, wherein the gas mixture additionally contains at least ~~any~~ one of He and~~or~~ Ar.

3. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 1, wherein the methylsilane is selected from the group consisting~~any one~~ of monomethylsilane ($SiH_3(CH_3)$), dimethylsilane ($SiH_2(CH_3)_2$), trimethylsilane ($SiH(CH_3)_3$), and~~or~~ tetramethylsilane ($Si(CH_3)_4$).

4. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 1, further comprising contacting~~wherein~~ the cladding layer ~~is brought into contact~~ with a dinitrogen monoxide ($N_2O$) or nitrogen ($N_2$) plasma.

5. (Currently Amended) A method of manufacturing an optical waveguide having a core layer and a cladding layer ~~for~~ covering the core layer, comprising:

forming~~wherein a~~ silicon oxy-nitride ~~film serving~~ as the core layer or the cladding layer ~~is formed~~ by plasmanizing a gas mixture containing (1) a silicon compound selected from the group consisting of~~any one of~~ methylsilanes, alkyl compounds having a siloxane bond, and~~or~~ alkyl compounds having an alkoxy bond, (2) dinitrogen monoxide ($N_2O$), and (3) at least ~~any~~ one of ~~the~~ nitrogen ($N_2$) and~~or~~ ~~the~~ ammonia ($NH_3$) for reaction~~to react~~.

6. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 5, wherein ~~a~~ refractive index of the silicon oxy-nitride layer~~film~~ is adjusted by controlling a flow rate of dinitrogen monoxide ($N_2O$), or nitrogen ($N_2$) or ammonia ($NH_3$).

7. (Original) A method of manufacturing an optical waveguide, according to claim 5, wherein the gas mixture contains oxygen ($O_2$).

8. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 5, wherein the gas mixture contains at least ~~any~~ one of ~~the~~ He and~~or~~ Ar.

9. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 5, wherein the silicon compound is a methylsilane

selected from the group consisting~~is any one~~ of monomethylsilane ($SiH_3(CH_3)$), dimethylsilane ($SiH_2(CH_3)_2$), trimethylsilane ($SiH(CH_3)_3$), and~~or~~ tetramethylsilane ($Si(CH_3)_4$).

10. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 5, wherein the silicon compound is an alkyl compound having a~~the~~ siloxane bond ~~is~~ selected from the group consisting~~any one~~ of hexamethyldisiloxane (HMDSO: $(CH_3)_3Si\text{-}O\text{-}Si(CH_3)_3$), octamethylcyclotetrasiloxane (OMCTS), and~~or~~ octamethyltrisiloxane (OMTS).

11. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 5, wherein the silicon compound is an alkyl compound having an~~the~~ alkoxy bond selected from the group consisting~~is any one~~ of dimethyldimethoxysilane ($Si(CH_3)_2(OCH_3)_2$), dimethyldiethoxysilane ($Si(CH_3)_2(OC_2H_5)_2$), and~~or~~ trimethoxysilane (TMS: $SiH(OCH_3)_3$).

12. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 5, further comprising contacting~~wherein~~ the cladding layer ~~is brought into contact~~ with a dinitrogen monoxide ($N_2O$) or nitrogen ($N_2$) plasma.

13. (Currently Amended) A method of manufacturing an optical waveguide having a core layer and a cladding layer ~~for~~ covering the core layer, comprising:

forming~~wherein~~ a silicon oxide film ~~serving~~ as the cladding layer ~~is formed~~ by plasmanizing a gas mixture containing a methylsilane and dinitrogen monoxide ($N_2O$) for reaction~~to react~~.

14. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 13, wherein ~~a~~ flow rate of the dinitrogen monoxide ($N_2O$) is at least 20 times the ~~or more a~~ flow rate of the methylsilane.

15. (Currently Amended) A method of manufacturing an optical waveguide according to claim 13, wherein the gas mixture additionally contains oxygen ($O_2$).

16. (Currently Amended) A method of manufacturing an optical waveguide, according to claim 13, further comprising contacting~~wherein~~ the cladding layer ~~is brought into contact~~ with a dinitrogen monoxide ($N_2O$) or nitrogen ($N_2$) plasma.

17. (Currently Amended) A method of manufacturing an optical waveguide according to claim 1 further~~having a core layer and a cladding layer for covering the core layer,~~ comprising ~~the steps of~~:

~~forming the core layer by the optical waveguide manufacturing method set forth in claim 1; and~~

forming a silicon oxide film as the cladding layer by plasmanizing a gas mixture containing a methylsilane and dinitrogen monoxide ($N_2O$) for reaction~~to react~~.

18. (Currently Amended) A method of manufacturing an optical waveguide according to claim 1 further~~having a core layer through which a light is propagated mainly and a cladding layer for covering the core layer,~~ comprising ~~the steps of~~:

~~forming the core layer by the optical waveguide manufacturing method set forth in claim 1; and~~

forming a silicon oxide film as the cladding layer by plasmanizing a gas mixture containing (1) a silicon compound selected from the group consisting~~any one~~ of methylsilanes, alkyl compounds having a siloxane bond, and~~or~~ alkyl compounds having an alkoxy bond, (2) dinitrogen monoxide ($N_2O$), and (3) at least ~~any~~ one of nitrogen ($N_2$) and~~or~~ ammonia ($NH_3$) for reaction~~to react~~.

19. (Currently Amended) A method of manufacturing an optical waveguide according to claim 5 further~~having a core layer and a cladding layer for covering the core layer,~~ comprising ~~the steps of~~:

~~forming the core layer by the optical waveguide manufacturing method set forth in claim 5; and~~

forming a silicon oxide film as the cladding layer by plasmanizing a gas mixture containing a methylsilane and dinitrogen monoxide ($N_2O$) for reaction~~to react~~.

20. (Currently Amended) A method of manufacturing an optical waveguide according to claim 5 further~~having a core layer through which a light is propagated mainly and a cladding layer for covering the core layer,~~ comprising ~~the steps of~~:

~~forming the core layer by the optical waveguide manufacturing method set forth in claim 5; and~~

forming a silicon oxide film as the cladding layer by plasmanizing a gas mixture containing (1) at least ~~any~~ one silicon compound selected from the group consisting of methylsilanes, alkyl compounds having a siloxane bond, and~~or~~ alkyl compounds having an alkoxy bond, (2) dinitrogen monoxide ($N_2O$), and (3) at least ~~any~~ one of nitrogen ($N_2$) and~~or~~ ammonia ($NH_3$) for reaction~~to react~~.

21. (Currently Amended) An optical waveguide formed by a method of manufacturing an optical waveguide according to~~set forth in~~ claim 17.

22. (Currently Amended) An optical waveguide formed by a method of manufacturing an optical waveguide according to~~set forth in~~ claim 18.

23. (Currently Amended) An optical waveguide formed by a method of manufacturing an optical waveguide according to~~set forth in~~ claim 19.

24. (Currently Amended) An optical waveguide formed by a method of manufacturing an optical waveguide according to~~set forth in~~ claim 20.

25. (New) A method of manufacturing an optical waveguide according to claim 1 wherein the gas mixture is selected from the group consisting of:

(1) a methylsilane and $N_2$

(2) a methylsilane, $N_2$ and Ar or He

(3) a methylsilane and $NH_3$

(4) a methylsilane, $NH_3$ and Ar or He

(5) a methylsilane, $N_2$ and $NH_3$; and

(6) a methylsilane, $N_2$, $NH_3$ and Ar or He.

26. (New) A method of manufacturing an optical waveguide according to claim 5 wherein the gas mixture is selected from the group consisting of:

(1) a methylsilane, $N_2$ and $N_2O$;

(2) a methylsilane, $N_2$, $N_2O$ and Ar or He;

(3) a methylsilane, $NH_3$ and $N_2O$;

(4) a methylsilane, $NH_3$, $N_2O$ and Ar or He;

(5) a methylsilane, $N_2$, $NH_3$ and $N_2O$;

(6) a methylsilane, $N_2$, $NH_3$, $N_2O$ and Ar or He;

(7) a siloxane, $N_2$, $NH_3$ and $N_2O$;

(8) a siloxane, $N_2$, $NH_3$, $N_2O$ and Ar or He;

(9) an alkoxy compound, $N_2$, $NH_3$ and $N_2O$;

(10) an alkoxy compound, $N_2$, $NH_3$, $N_2O$ and Ar or He;

(11) a methylsilane, $N_2$, $N_2O$ and oxygen;

(12) a methylsilane, $N_2$, $N_2O$, Ar or He, and oxygen;

(13) a methylsilane, $NH_3$, $N_2O$ and oxygen;

(14) a methylsilane, $NH_3$, $N_2O$, Ar or He, and oxygen;

(15) a methylsilane, $N_2$, $NH_3$, $N_2O$ and oxygen;

(16) a methylsilane, $N_2$, $NH_3$, $N_2O$, Ar or He and oxygen;

(17) a siloxane, $N_2$, $NH_3$, $N_2O$ and oxygen;

(18) a siloxane, $N_2$, $NH_3$, $N_2O$, Ar or He and oxygen;

(19) an alkoxy compound, $N_2$, $NH_3$, $N_2O$ and oxygen; and

(20) an alkoxy compound, $N_2$, $NH_3$, $N_2O$, Ar or He, and oxygen.

27. (New) A method for manufacturing an optical waveguide according to claim 1 further comprising:

forming silicon oxy-nitride as the cladding layer by plasmanizing a gas mixture selected from the group consisting of:

(1) a methylsilane, $N_2$ and $N_2O$;

(2) a methylsilane, $N_2$, $N_2O$ and Ar or He;

(3) a methylsilane, $NH_3$ and $N_2O$;

(4) a methylsilane, $NH_3$, $N_2O$ and Ar or He;

(5) a methylsilane, $N_2$, $NH_3$ and $N_2O$;

(6) a methylsilane, $N_2$, $NH_3$, $N_2O$ and Ar or He;

(7) a siloxane, $N_2$, $NH_3$ and $N_2O$;

(8) a siloxane, $N_2$, $NH_3$, $N_2O$ and Ar or He;

(9) an alkoxy compound, $N_2$, $NH_3$ and $N_2O$;

(10) an alkoxy compound, $N_2$, $NH_3$, $N_2O$ and Ar or He;

(11) a methylsilane, $N_2$, $N_2O$ and oxygen;

(12) a methylsilane, $N_2$, $N_2O$, Ar or He, and oxygen;

(13) a methylsilane, $NH_3$, $N_2O$ and oxygen;

(14) a methylsilane, $NH_3$, $N_2O$, Ar or He, and oxygen;

(15) a methylsilane, $N_2$, $NH_3$, $N_2O$ and oxygen;

(16) a methylsilane, $N_2$, $NH_3$, $N_2O$, Ar or He and oxygen;

(17) a siloxane, $N_2$, $NH_3$, $N_2O$ and oxygen;

(18) a siloxane, $N_2$, $NH_3$, $N_2O$, Ar or He and oxygen;

(19) an alkoxy compound, $N_2$, $NH_3$, $N_2O$ and oxygen; and

(20) an alkoxy compound, $N_2$, $NH_3$, $N_2O$, Ar or He, and oxygen.

28. (New) A method of manufacturing an optical waveguide according to claim 13 wherein the gas mixture is selected from the group consisting of:

(1) a methylsilane and $N_2$

(2) a methylsilane, $N_2$ and Ar or He

(3) a methylsilane and $NH_3$

(4) a methylsilane, $NH_3$ and Ar or He

(5) a methylsilane, $N_2$ and $NH_3$; and

(6) a methylsilane, $N_2$, $NH_3$ and Ar or He.

29. (New) A method of manufacturing an optical waveguide according to claim 13 wherein the gas mixture is selected from the group consisting of:

(1) a methylsilane, $N_2$ and $N_2O$;

(2) a methylsilane, $N_2$, $N_2O$ and Ar or He;

(3) a methylsilane, $NH_3$ and $N_2O$;

(4) a methylsilane, $NH_3$, $N_2O$ and Ar or He;

(5) a methylsilane, $N_2$, $NH_3$ and $N_2O$;

(6) a methylsilane, $N_2$, $NH_3$, $N_2O$ and Ar or He;

(7) a siloxane, $N_2$, $NH_3$ and $N_2O$;

(8) a siloxane, $N_2$, $NH_3$, $N_2O$ and Ar or He;

(9) an alkoxy compound, $N_2$, $NH_3$ and $N_2O$;

(10) an alkoxy compound, $N_2$, $NH_3$, $N_2O$ and Ar or He;

(11) a methylsilane, $N_2$, $N_2O$ and oxygen;

(12) a methylsilane, $N_2$, $N_2O$, Ar or He, and oxygen;

(13) a methylsilane, $NH_3$, $N_2O$ and oxygen;

(14) a methylsilane, $NH_3$, $N_2O$, Ar or He, and oxygen;

(15) a methylsilane, $N_2$, $NH_3$, $N_2O$ and oxygen;

(16) a methylsilane, $N_2$, $NH_3$, $N_2O$, Ar or He and oxygen;

(17) a siloxane, $N_2$, $NH_3$, $N_2O$ and oxygen;

(18) a siloxane, $N_2$, $NH_3$, $N_2O$, Ar or He and oxygen;

(19) an alkoxy compound, $N_2$, $NH_3$, $N_2O$ and oxygen; and

(20) an alkoxy compound, $N_2$, $NH_3$, $N_2O$, Ar or He, and oxygen.